REMARKS

Reconsideration of the above-identified application in view of the amendments above and the remarks following is respectfully requested.

Claims 1-34 are in this case. Claims 1-25 and 27 were previously canceled. Claims 26-34 have been rejected. Claims 26 and 31-32 have now been amended. Claims 27 and 29 have now been canceled.

Specification/Drawing

The Examiner points out that the drawing description of figures 2 and 4 does not properly identify the sequences set forth in the instant application.

The legend of Figures 2 and 4 has been amended accordingly to comply with the Examiner's requirement.

35 U.S.C. § 112 Second Paragraph,

The Examiner has rejected claims 26 and 29 under 35 U.S.C. § 112, second paragraph for being indefinite. The Examiner's rejections are respectfully traversed. Claim 26 has now been amended. Claim 29 has now been cancelled.

The Examiner points out that it is unclear how claim 29 further limits claim 26 since such signals would be required to accomplish the functional limitations of claim 26.

Claim 29 has now been cancelled and claim 26 has now been amended to recite

> "...a cellulose binding peptide and a recombinant protein having a heterologous signal peptide for directing said fusion protein into a cellular compartment of cells of said plant or cultured plant cells and/or a heterologous retaining peptide capable of retaining said fusion protein in said cellular compartment..."

to thereby overcome the Examiner rejections.

35 U.S.C. § 102 Rejections

The Examiner has rejected claims 26, 28, 30 and 33-34 under 35 U.S.C. § 102(b) as being anticipated by U.S. Pat. No. 5,670,623 to Shoseyev et al. or by U.S. Pat. No. 5,719,044 to Shoseyev et al. The Examiner's rejections are respectfully traversed. Claims 26 has now been amended.

The Examiner points out that fusion proteins specifically recited in the allowed claims of U.S. Pat. Nos. 5,670,623 and 5,719,044 are proteins that are present in cellular locations other than the cell wall. For example, glycosyltransferases are present in the ER of eukaryotic cells. The Examiner asserts that the fusion proteins specifically claimed by U.S. Pat. Nos. 5,670,623 and 5,719,044 would result in compartmentalization of the fusion protein produced and, therefore, the teachings of both references anticipate the instant claims.

Applicant wishes to point out that the fusion proteins recited in the claims of U.S. Pat. Nos. 5,670,623 and 5,719,044 are capable of being expressed in cellular locations other than the cell wall only because the fusion protein includes a (second) protein such as an enzyme, a hormone, an antibody, etc. which inherently includes an endogenous signal sequence thus enabling its expression and function in a sub-cellular compartment. However, neither of these references describes or suggests using a fusion protein which includes a heterologous signal peptide. In sharp contrast, the instant application teaches using a fusion protein which includes a heterologous signal peptide for directing the fusion protein into a specific compartment. The advantage of including an heterologous signal peptide in the fusion protein relies in enabling a control of targeting the fusion protein expression into a preferred sub-cellular compartment in cases where a homologous signal sequence is absent or deficient (e.g., for having poor selectivity and/or specificity).

Thus, in order to further distinguish the claimed invention from the teachings of U.S. Pat. Nos. 5,670,623 and 5,719,044, claim 26 of the instant application has now been amended such that the claimed fusion protein includes "...a cellulose binding peptide and a recombinant protein having a heterologous signal peptide for directing said fusion protein into a cellular compartment..."

Ample support for this limitation is provided in the instant application. For example, page 40 line 8 to page 41 line 3 recites the following:

> "...Accordingly, the heterologous sequence used while implementing the process according to this aspect of the present invention includes (i) a first sequence encoding a cellulose binding peptide; (ii) a second sequence encoding a recombinant protein, wherein the first and second sequences are joined together in frame; and (iii) a third sequence encoding a signal peptide for directing a protein to a cellular compartment, the third sequence being upstream and in frame with the first and second sequences.
>
> The following provides description of signal peptides which can be used to direct the fusion protein according to the present invention to specific cell compartments.
>
> It is well-known that signal peptides serve the function of translocation of produced protein across the endoplasmic reticulum membrane. Similarly, transmembrane segments halt translocation and provide anchoring of the protein to the plasma membrane, see, Johnson *et al.* The Plant Cell (1990) 2:525-532; Sauer *et al.* EMBO J. (1990) 9:3045-3050; Mueckler *et al.* Science (1985) 229:941-945. Mitochondrial, nuclear, chloroplast, or vacuolar signals target expressed protein correctly into the corresponding organelle through the secretory pathway, see, Von Heijne, Eur. J. Biochem. (1983) 133:17-21; Yon Heijne, J. Mol. Biol. (1986) 189:239-242; Iturriaga *et al.* The Plant Cell (1989) 1:381-390; McKnight *et al.*, Nucl. Acid Res. (1990) 18:4939-4943; Matsuoka and Nakamura, Proc. Natl. Acad. Sci. USA (1991) 88:834-838. A recent book by Cunningham and Porter (Recombinant proteins from plants, Eds. C. Cunningham and A.J.R. Porter, 1998 Humana Press Totowa, N.J.) describe methods for the production of recombinant proteins in plants and methods for targeting the proteins to different compartments in the plant cell. In particular, two chapters therein (14 and 15) describe different methods to introduce

targeting sequences that results in accumulation of recombinant proteins in compartments such as ER, vacuole, plastid, nucleus and cytoplasm. The book by Cunningham and Porter is incorporated herein by reference. Presently, the preferred site of accumulation of the fusion protein according to the present invention is the ER using signal peptide such as Cel 1 or the rice amylase signal peptide at the N-terminus and an ER retaining peptide (HDEL, SEQ ID NO:1; or KDEL, SEQ ID NO:2) at the C-terminus."

Hence, since a fusion protein having a heterologous signal peptide is not described or suggested by either U.S. Pat. No. 5,670,623 or U.S. Pat. No. 5,719,044, neither of these references anticipates or renders obvious the present invention as now claimed.

The Examiner has rejected claims 26, 28-30 and 33-34 under 35 U.S.C. § 102(f) on the ground that the applicant did not invent the claimed subject matter. The examiner's rejections are respectfully traversed. Claims 26 has now been amended. Claim 29 has now been cancelled.

The Examiner asserts that the teachings of U.S Pat. Nos. 5,670,623 and 5,719,044 anticipate the claimed invention.

As is argued above with respect to the 102(b) rejection, Applicant is of the strong opinion that the invention as now claimed is clearly distinct from, and not anticipated or rendered obvious by U.S Pat. Nos. 5,670,623 and 5,719,044.

Thus, it is also Applicant's opinion that in light of claim amendments and arguments presented above, U.S Pat. Nos. 5,670,623 and 5,719,044 cannot be used as a basis for a 102(f) rejection.

Double Patenting

The Examiner has rejected claims 26, 28, 30 and 33-34 under the doctrine of obviousness-type double patenting as being unpatentable over claims 1-19 of U.S. Pat. No. 5,670,623 and over claims 27-34 of U.S. Pat. No. 5,719,044 to Shoseyev et

al. The examiner's rejections are respectfully traversed. Claims 26 has now been amended.

The Examiner points out that although the references do not specifically recite compartmentalization of the fusion protein, the claims set forth specific fusion protein constructs which, when expressed, would be present in the ER or endosome. The Examiner asserts that although the conflicting claims are not identical, they are not patentably distinct from each other.

As argued hereinabove, now amended claims 26, previously added claims 28, 30 and 33-34 of the instant application, are clearly distinct from claims 1-19 of US Pat. No. 5,670,623 and claims 27-34 of U.S. Pat. No. 5,719,044 since claims 1-19 and 27-34 do not include the limitation of including a heterologous signal peptide (for directing the fusion protein into a sub-cellular compartment), nor can they be interpreted to include such limitations since, as argued above, the specifications of U.S. Pat. Nos. 5,670,623 and 5,719,044 do not provide support or motivation for the heterologous signal peptide feature essential to the present invention.

Therefore it is respectfully submitted that claims 26, 28 and 30-34 are now in condition for allowance. Prompt Notice of Allowance is respectfully and earnestly solicited.

Respectfully submitted,

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